

IN THE CLAIMS:

The following listing of claims will replace all prior versions and listings of claims in the Application.

Listing of Claims

- 1 1. (Previously Presented) A system for identifying pixels inside a graphics primitive of
2 a raster image, the system comprising:
3 a memory for storing a raster image; and
4 a graphics engine coupled to the memory and comprising a pipeline structure, the
5 pipeline structure comprising a first plurality of sequential logic circuits coupled in series
6 and a second plurality of parallel logic circuits coupled to the first plurality of sequential
7 logic circuits, each of the sequential logic circuits and each of the parallel logic circuits
8 configured to receive a different polygonal portion of the raster image and to determine
9 whether the received polygonal portion is at least partly inside the graphics primitive.
- 1 2. (Cancelled)
- 1 3. (Previously Presented) The system of claim 1 wherein the pipeline structure is
2 further configured to divide the polygonal portion into a predetermined number of
3 polygonal subportions if the polygonal portion is at least partly inside the graphics
4 primitive.
- 1 4. (Previously Presented) The system of claim 1 wherein the pipeline structure
2 determines whether the polygonal portion of the raster image is at least partly inside the
3 graphics primitive by evaluating edge functions of the graphics primitive on at least one
4 corner vertex of the polygonal portion.
- 1 5. (Previously Presented) The system of claim 4 wherein each edge function of the
2 graphics primitive is a vector function comprising both an x-component and a y-component
3 of a vector normal to the edge function.

1 6. (Previously Presented) The system of claim 4 wherein the edge functions are
2 evaluated on at least one corner vertex of the polygonal portion to determine a corner vertex
3 of the polygonal portion being farthest from a primitive edge associated with the edge
4 function in a direction toward the inside of the graphics primitive.

1 7. (Previously Presented) The system of claim 1, wherein the sequential logic circuits
2 are followed by the parallel logic circuits.

1 8. (Previously Presented) The system of claim 1, wherein the parallel logic circuits are
2 coupled together in a pyramid structure.

1 9. (Previously Presented) The system of claim 3 wherein the predetermined number of
2 polygonal subportions is two and the pipeline structure determines the two polygonal
3 subportions by determining midpoint values of two opposite sides of the polygonal portion
4 of the raster image and using the midpoint values as vertices of the two polygonal
5 subportions.

1 10. (Previously Presented) The system of claim 1 wherein the pipeline structure further
2 comprises a predetermined number of pixel engines coupled to at least some of the parallel
3 logic circuits and configured to determine attribute values associated with each pixel.

1 11. (Original) The system of claim 1 wherein the polygonal portion of a raster image has
2 a width ΔX and a height ΔY , each of the width ΔX and the height ΔY having a value of
3 2^m .

- 1 12. (Currently Amended)) A method of identifying pixels inside a graphics primitive of
2 a raster image, comprising the steps of:
- 3 (a) determining whether a polygonal portion of the raster image is at least partly
4 inside the graphics primitive by using a coordinate reference frame of the polygonal portion,
5 the coordinate reference frame located at a geometric center of the polygonal portion;
- 6 (b) dividing the polygonal portion of the raster image into a predetermined number
7 of polygonal subportions if the polygonal portion of the raster image is at least partly inside
8 the graphics and relocating the coordinate reference frame to a geometric center of each
9 polygonal subportion;
- 10 (c) determining whether each polygonal subportion of the raster image is at least
11 partly inside the graphics primitive; and
- 12 (d) further dividing the polygonal subportion into a predetermined number of
13 polygonal subportions if the polygonal subportion is at least partly inside the graphics
14 primitive and is larger than a pixel and relocating the coordinate reference frame to a
15 geometric center of each of the predetermined number of polygonal subportions.
- 1 13. (Original) The method of claim 12 further comprising the step of recursively
2 performing (c) and (d) until there are no more polygonal subportions that are at least partly
3 inside the graphics primitive.
- 1 14. (Previously Presented) The method of claim 12, wherein the determining step (a)
2 further comprises the step of receiving a plurality of values for corner vertices of the
3 polygonal portion and arithmetic edge functions, each of the arithmetic edge functions
4 corresponding to an edge of the graphics primitive.

- 1 15. (Previously Presented) The method of claim 14, wherein the determining step (a)
2 further comprises the step of evaluating an arithmetic edge function corresponding to an
3 edge of the graphics primitive on at least one corner vertex of the polygonal portion to
4 determine a corner vertex being farthest from the corresponding edge of the graphics
5 primitive in a direction toward the inside of the graphics primitive.
- 6 16. (Original) The method of claim 15 wherein the polygonal portion is at least partly
7 inside the graphics primitive if all arithmetic edge functions evaluated are positive.
- 8 17. (Previously Presented) The method of claim 12 wherein the dividing step (b) further
9 comprises the step of dividing the polygonal portion into two polygonal subportions by
10 determining midpoint values of two opposite sides of the polygonal portion.
- 1 18. (Original) The method of claim 12 wherein the dividing step (b) further comprises
2 the step of sequentially deriving two new sets of arithmetic edge functions associated with a
3 translated coordinate reference frame located at a geometric center of a corresponding one of
4 the polygonal subportions.
- 1 19. (Previously Presented) The method of claim 12 wherein the dividing step (b) further
2 comprises the step of outputting multiple sets of information, wherein each set of
3 information includes corner vertices of one of the polygonal subportions and a
4 corresponding new set of derived arithmetic edge functions defining the one polygonal
5 subportion.

1 20. (Currently Amended) An electronically-readable medium having embodied thereon
2 a program, the program being executable by a machine to perform method steps for
3 identifying pixels inside graphics primitives of a raster image, the method steps comprising:
4 (a) determining whether a polygonal portion of the raster image is at least partly
5 inside the graphics primitive by using a coordinate reference frame of the polygonal portion,
6 the coordinate reference frame located at a geometric center of the polygonal portion;
7 (b) dividing the polygonal portion into a predetermined number of polygonal
8 subportions if the polygonal portion is at least partly inside the graphics primitive and
9 relocating the coordinate reference frame to a geometric center of each of the polygonal
10 subportions;
11 (c) determining whether the polygonal subportion is at least partly inside the
12 graphics primitive for each polygonal subportion; and
13 (d) dividing the polygonal subportion into a further predetermined number of
14 polygonal subportions if the polygonal subportion is at least partly inside the graphics
15 primitive and the polygonal subportion is larger than a pixel and relocating the coordinate
16 reference frame to a geometric center of each of the further predetermined number of
17 polygonal subportions.

1 21. (Original) The electronically-readable medium of claim 20 further comprising the
2 step of recursively performing steps (c) and (d) for each polygonal subportion larger than a
3 pixel that is at least partly inside the graphics primitive.

1 22. (Currently Amended) A method of identifying pixels inside a graphics primitive of a
2 raster image comprising the steps of:
3 selecting a tile including a pixel;
4 defining a coordinate reference frame for the tile, the coordinate reference frame
5 located at a geometric center of the tile;
6 determining if a portion of the tile is within the graphics primitive;
7 dividing the tile into subtiles if a portion of the tile is within the graphics primitive
8 and an other portion of the tile is outside the graphics primitive;
9 relocating the coordinate reference frame to a geometric center of each of the subtiles;
10 and
11 recursively dividing each subtile larger than a pixel and having a portion within the
12 graphics primitive and an other portion outside the graphics primitive into further subtiles
13 and relocating the coordinate reference frame to a geometric center of each of the further
14 subtiles.

1 23. (Cancelled)

1 24. (Previously Presented) The method of claim 22 wherein the step of determining
2 further comprises evaluating the tile at a corner vertex which is farthest in a direction
3 toward the inside of the graphics primitive relative to an edge of the graphics primitive..

1 25. (Previously Presented) The method of claim 22 wherein the step of recursively
2 dividing further comprises determining if the subtile is at least partly within the graphics
3 primitive by evaluating the subtile at a corner vertex which is farthest in a direction toward
4 the inside of the graphics primitive relative to an edge of the graphics primitive.

1 26. (Cancelled)

1 27. (Previously Presented) The electronically-readable medium of claim 20, wherein the
2 polygonal portion is a tile and the polygonal subportion is a subtile.

1 28. (Previously Presented) A method of rasterizing a graphics primitive for a raster image,
2 the method comprising the steps of:

3 deriving edge functions for the graphics primitive according to a coordinate reference
4 frame of a tile in the raster image, the coordinate reference frame located at a geometric center
5 of the tile, each edge function corresponding to an edge of the graphics primitive; and

6 evaluating each edge function on at least one vertex of the tile to determine at least one
7 vertex of the tile inside the graphics primitive.

1 29. (Presently Amended) The method of claim 28, further comprising the steps of:

2 evaluating at least one edge function on at least one vertex of the tile to determine
3 whether a portion of the tile is outside the graphics primitive;

4 dividing the tile into subtiles if a portion of the tile is inside the graphics primitive
5 and a portion of the tile is outside the graphics primitive and relocating the coordinate
6 reference frame to a geometric center of each subtile; and

7 dividing each subtile larger than a pixel and having a portion inside the graphics
8 primitive and a portion outside the graphics primitive into further subtiles and relocating
9 the coordinate reference frame to a geometric center of each of the further subtiles.